

## 6. Universal health coverage index at district level

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A key health-related component of the 2030 Sustainable Development Goals (SDGs) is the delivery of universal health coverage (UHC), which requires that all people receive quality, effective health services without significant financial strain.<sup>a</sup> Delivering UHC has therefore become a key global health priority,<sup>b</sup> underscoring the commitment to the right to health as grounded in international human rights laws.<sup>c</sup> Monitoring progress towards the attainment of SDG 3.8 is based on two high-level indicators:<sup>d</sup>

- ◆ Indicator 3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health (RMNCH); infectious diseases; non-communicable diseases; and service capacity and access; among the general and the most disadvantaged population).
- ◆ Indicator 3.8.2: Proportion of population with large household expenditure on health as a share of total household expenditure or income.

Hogan et al.<sup>e</sup> have developed a UHC service coverage index to monitor the extent of essential health services coverage, based on 16 tracer measures (some of which are proxies of service coverage). Advice on application of the proposed index has also been provided by the World Health Organization (WHO).<sup>f</sup> Importantly, Hogan et al. state that the chosen tracer indicators are not a comprehensive measure of service coverage, but are a useful summary, in that they deliver a single numerical value to depict the extent of the coverage of essential health and health-related services.<sup>e</sup> Development of the index was based on four guiding principles:

- ◆ The index should cover the main health areas listed in SDG 3.8.1.
- ◆ Where possible, measures of effective service coverage (see Box 1) should be selected.
- ◆ The index should encompass the full spectrum of essential health interventions, including prevention, promotion, treatment, rehabilitation and palliative care.
- ◆ The index should enable disaggregation by key dimensions of inequality.

However, it was acknowledged that because of lack of data, it is not always possible to calculate the UHC service coverage index across all key dimensions of inequality. Furthermore, unless health interventions are designed in ways that promote health equity, efforts to achieve UHC may lead to improvements in the national average of service coverage while inequalities persist or even worsen in parallel.<sup>g</sup>

a World Health Organization. Primary Health Care on the Road to Universal Health Coverage: 2019 Global Monitoring Report. Geneva: WHO; 2019.

b Barasa E, Nguhiu P, McIntyre D. Measuring progress towards Sustainable Development Goal 3.8 on universal health coverage in Kenya. *BMJ Glob Health*. 2018;3(3):e000904.

c Abihiro GA, De Allegri M. Universal health coverage from multiple perspectives: a synthesis of conceptual literature and global debates. *BMC Int Health Hum Rights*. 2015;15:17.

d Boerma JT, Evans D, Kiény M-P, Eozenou P, Evans T, Wagstaff A. Monitoring progress towards universal health coverage at country and global levels. Framework, measures and targets. Geneva: World Health Organization and The World Bank; 2014.

e Hogan DR, Stevens GA, Hosseinpoor AR, Boerma T. Monitoring universal health coverage within the Sustainable Development Goals: development and baseline data for an index of essential health services. December 2017. Available from: [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(17\)30472-2/](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(17)30472-2/).

f World Health Organization. SDG Indicators: Metadata repository 3.8.1: United Nations; 2019 [updated May 2018]. Available from: <https://unstats.un.org/sdgs/metadata/>.

g World Health Organization, International Bank for Reconstruction and Development/World Bank. Tracking Universal Health Coverage: 2017 Global Monitoring Report. Geneva: WHO and International Bank for Reconstruction and Development/World Bank; 2017.

**Box 1: Key measurement concepts for effective service coverage**

- **Tracer indicators** are a subset of indicators chosen to represent overall coverage. They are not necessarily fully representative of a recommended basket of services but enable the breadth of health services to be captured in a measurable way.
- **Proxy indicators** are used where data on indicators of effective service coverage or service coverage are unavailable. However, they are not direct measures of service coverage, effective or otherwise, e.g. the prevalence of non-smoking of tobacco is a proxy for effective coverage measures to reduce tobacco use.
- **Service coverage** refers to the proportion of people in need of a service who receive it, regardless of the quality of that service.
- **Effective service coverage** is defined as the proportion of people in need of services who receive services of sufficient quality to obtain potential health gains.

Source: WHO/World Bank.<sup>9</sup>

**Data sources**

As part of a broader effort to explore trends in the UHC service coverage index over time at sub-national level in South Africa, an extensive database was compiled using suggested and alternative indicators from multiple data sources. The data were extracted from a variety of sources that included periodic surveys conducted between 1998 and 2018, routine health service delivery data captured between the 2000/01 and 2018/19 financial years, and modelled data, as shown in Table 1. Tables 2 and 3 provide detail on how the South African index was constructed, and the rescaling or adjustment methods applied. A district-level index was calculated for 2016/17, as this was the only time period for which data were available across the whole basket of indicators. Consequently, although more recent data are available for some indicators, they could not be included in the index calculation. In order to calculate the index, the maximum value was taken for each data point between 2016 and 2017.

**Table 1: Data sources used for the South African UHC service coverage index calculation**

Major periodic surveys	Routine data	Modelled data
Census	District Health Information Software (DHIS)	Thembisa model of the South African HIV epidemic (Thembisa 4.2)
South Africa Demographic and Health Survey (SADHS)	Public personnel and salary (PERSAL) system	South African National Health and Nutrition Examination Survey (SANHANES)
Community survey (CS)	National Department of Health (NDoH) records	SADHS
General Household Survey (GHS)	Electronic Tuberculosis and HIV Register (TIER.Net)	DHIS
South African National HIV Prevalence, Incidence, Behaviour and Communication Surveys (SABSSM)		
National Income Dynamics Study (NiDS)		
SANHANES		

**Calculation of the UHC service coverage index**

The 16 tracer indicators included in the UHC service coverage index proposed by Hogan et al. cover the four categories listed in SDG 3.8.1, namely RMNCH; infectious diseases; non-communicable diseases (NCDs); and service capacity and access. The geometric mean of the indicators is calculated for each category. The final UHC service coverage index is the geometric mean of the values for each category score. The UHC service coverage index is presented on a scale of 0-100, with 100 being the optimal value.<sup>h</sup> Where possible, the index measures quality through the estimation of effective coverage.

<sup>h</sup> The Lancet. Ensuring and measuring universality in UHC. Lancet. 2019;393(10166):1.

Table 2 shows the 15 indicators incorporated into the South African UHC service coverage index. The malaria service coverage indicator was excluded, as bed-nets are not provided in South Africa, so no measure of service coverage could be calculated.

**Table 2: Calculating the South African UHC service coverage index**

Service area category	Tracer area	Tracer indicator	Type	Index calculation
<b>RMNCH</b>	UHC1: Family planning (FP)	Couple year protection rate (%)	Effective service coverage	$RMNCH = (FP * PDC * Imm * CT)^{1/4}$
	UHC2: Pregnancy and delivery care (PDC)	Antenatal 1st visit coverage before 20 weeks (%)	Service coverage	
	UHC3: Child immunisation (Imm)	Immunisation under 1 year coverage (%)	Service coverage	
	UHC4: Child treatment (CT -Pneumonia)	Pneumonia case fatality under 5 years rate (%)	Service coverage	
<b>Infectious diseases</b>	UHC5: Tuberculosis (TB) treatment	TB effective treatment coverage (%)	Effective service coverage	$Infectious = (TB * HIV * WASH)^{1/3}$
	UHC6: Human immunodeficiency virus (HIV) treatment	Antiretroviral effective coverage (%)	Service coverage	
	UHC7: Malaria (excluded)	-	-	
	UHC8: Water and sanitation (WASH)	% of households with access to improved sanitation	Service coverage	
<b>NCDs</b>	UHC9: Prevention of cardiovascular disease (Blood pressure (BP))	Prevalence of non-raised blood pressure regardless of treatment status	Proxy	$NCD = (BP * Diab * CervCA * Tobacco)^{1/4}$
	UHC10: Management of diabetes (Diab)	Percentage of people with diabetes receiving treatment	Proxy	
	UHC11: Cancer detection (Cervical cancer (CervCA))	Cervical cancer screening coverage (%)	Service coverage	
	UHC12: Tobacco control (Tobacco)	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days	Proxy	
<b>Capacity</b>	UHC13: Facility access (Beds)	Hospital beds per 10 000 target population	Proxy	$Capacity = (Beds * HWD * Meds * IHR)^{1/4}$
	UHC14: Health worker density (HWD)	Health worker density	Proxy	
	UHC15: Access to essential medicines (Meds)	Proportion of health facilities with essential medicines	Proxy	
	UHC16: Health security (International Health Regulations (IHR))	Environmental health services compliance rate	Proxy	
<b>Index</b>	UHC service coverage index	-	-	$UHC\ index = (RMNCH * Infectious * NCD * Capacity)^{1/4}$

Source: Adapted from Hogan et al.<sup>e</sup> \* = multiply,  $1/4$  is the exponent - i.e. the four indicators multiplied together, raised to the power of a quarter (or 0.25),  $1/3$  is the exponent i.e. the three indicators multiplied together, raised to the power of a third (or 0.33).

Although most tracer indicators could be used directly in their natural scale, some indicators required that the data be transformed before the index could be calculated. Table 3 lists the data sources used to compute the district level UHC service coverage index, as well as the transformations that were used to arrive at the value for each tracer indicator. Specifically, Table 3 shows the difference between the indicators proposed by Hogan et al. and the alternatives relied on in South Africa, which allowed disaggregation to district level. Where possible, effective service coverage alternatives were used. The data sources relied on are listed in square brackets.

**Table 3: Indicator and data source options for a sub-national South African UHC index**

	Index indicator (global)	Alternative for regular sub-national (district level) indicators
UHC1	Demand satisfied with modern methods in women aged 15 - 49 years who are married or in a union (%)	Couple year protection rate [DHIS] Rescaled to cap values at 100. Missing values set to 1. Calculated as: sum of (oral contraceptive pill cycles /15), (medroxyprogesterone injection /4), (norethisterone enanthate injection /6), (intrauterine contraceptive device x 4.5), (sub-dermal implant x 2.5), (male condoms distributed /120), (female condoms distributed /120), (male sterilisation x 10) and (female sterilisation x 10).
UHC2	Four or more visits to antenatal care (ANC) (%)	Antenatal 1st visit before 20 weeks rate [DHIS] Index calculated using ANC 1st visit coverage (cap values at 100%) multiplied by the 1st visits before 20 weeks' gestation rate (equivalent to ANC 1st visits before 20 weeks divided by the estimated number of pregnant women (for which the proxy is the population under 1 year x factor of 1.15)).
UHC3	Children aged 1 year who have received three doses of a diphtheria, tetanus, and pertussis vaccine (%)	Immunisation under 1 year coverage [DHIS] Rescaled to cap values at 100. Missing values set to 1.
UHC4	Care-seeking behaviour for children with suspected pneumonia (%)	Pneumonia case fatality under 5-years rate (index) [DHIS] After removing four outlier values in four different districts, a smoothed estimate of the pneumonia case fatality rate (CFR) under 5-years was computed using a generalised additive model with thin-plate splines. The WHO advice on rescaling a continuous measure is to apply the formula: index = (max risk value - original value)/(max risk - min risk) x 100.
UHC5	Tuberculosis effective treatment coverage (%)	TB effective treatment coverage calculated using: Case detection rate (all forms): national figure only Drug-sensitive TB treatment success rate (TIER.Net).
UHC6	People with HIV receiving antiretroviral therapy (%)	Antiretroviral effective coverage (people living with HIV (PLHIV), on treatment and virally suppressed) calculated using these two data elements: Total number living with HIV, on treatment, with viral load suppressed at 12 months (TIER.Net) Total PLHIV Estimates for PLHIV were derived by a modelling and triangulation methodology described in DHB 2017/18. <sup>9</sup>
UHC7	Population at risk who sleep under insecticide-treated bed-nets (%)	Not measured in South Africa (as insecticide-treated bed-nets are not routinely provided), so excluded.
UHC8	Households with access to at least basic sanitation (%)	Households with access to improved sanitation [Census, CS]  This includes the number of households with access to: flush to piped sewer system, flush to septic tank, flush/pour flush to pit, flush/pour flush to elsewhere.
UHC9	Prevalence of non-raised blood pressure regardless of treatment status (%)	Prevalence of non-raised blood pressure regardless of treatment status, age-standardised [NiDS]  The prevalence values were age-standardised using Statistics South Africa's (Stats SA) population estimates from Census 2011. The index was rescaled to obtain finer resolution across districts, using the formula: index = (original value - minimum)/(100 - minimum) x 100.
UHC10	Mean fasting plasma glucose (mmol/l) / age-standardised mean fasting plasma glucose for adults aged 25 years and older	Diabetes treatment coverage [NiDS, using predictor information of diabetes prevalence from SADHS, SANHANES]  Estimates were generated using a machine learning model that was trained with SADHS 2016 data to predict individual probability of being diabetic using demographic data (age, gender, race), bio-behavioural characteristics (body mass index, waist circumference, current smoking), self-reported previous diagnosis, and use of medication. The model was then applied to data from each NiDS 'wave' to estimate the prevalence at sub-national level by averaging the predicted probabilities of being diabetic for the individuals in each district and adjusting for the imperfect sensitivity and specificity of the predictive model. The sampling design of the survey was taken into account in the procedure. The proportion of patients with diabetes receiving treatment was directly estimated from self-reported data, and treatment coverage was calculated as the ratio between the population proportion of treated cases and diabetes prevalence. A smooth variation over time was assumed for both prevalence of diabetes and treatment coverage within each district, and final yearly estimates were generated by fitting a series of generalised linear models.
UHC11	Cervical cancer screening in women aged 30 - 49 years (%)	Cervical cancer screening coverage [DHIS]  Rescaled to cap values at 100. Missing values set to 1.
UHC12	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days (%)	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days [NiDS]

	Index indicator (global)	Alternative for regular sub-national (district level) indicators
UHC13	Number of hospital beds per person	Hospital bed density (beds per 10 000 target population) [DHIS, uninsured population estimates]  Uninsured population estimates were generated using a small area model based on the 2011 Census and 2016 Community Survey, and scaled using the 2018 General Household Survey and the Council for Medical Schemes data. <sup>i</sup> The total number of public sector hospital beds per district was used.  Rescaled using the proposed target of 18 beds per 10 000 population, as $x/18 \times 100$ , $>18$ per 10 000 = 100, cap index at 100.
UHC14	Number of health professionals per person: comprising physicians, psychiatrists, and surgeons	Health worker density [PERSAL, uninsured population estimates]  PERSAL data were used to calculate the index values based on the number of medical practitioners, professional nurses and pharmacists employed in the public sector using the methodology proposed by the Global Burden of Disease 2017 SDG Collaborators. <sup>j</sup> Their method calculates health worker density using the geometric mean of scaled scores for each cadre, with thresholds of 30 physicians, 100 nurses and midwives, and 5 pharmacists per 10 000 population.
UHC15	Proportion of health facilities with availability of the WHO-recommended core list of essential medicines	Proportion of health facilities with essential medicines [DHIS]  Rescaled as the inverse of the tracer items stock-out rate in fixed clinics/community health centres (CHCs) or community day centres (CDCs): $(100 - \text{tracer stock-out})$ . Values $<0$ set to 1 tracer items stock-out rate (fixed clinic/CHC/CDC).
UHC16	International Health Regulations core capacity index	Environmental health services compliance rate [NDoH]  The NDoH has set national environmental health services (EHS) norms and standards that municipalities should adhere to in rendering EHS. The quality of EHS rendered is measured using these norms and standards.

This chapter provides the South African UHC service coverage categories and the resultant index per district for 2016/17, based on the methodology proposed by Hogan et al.<sup>e</sup> and adapted using the alternative approaches listed above.

## Reproductive, maternal, newborn and child health indicators

### UHC1: Family planning

The first indicator for the UHC service coverage index covers family planning; it was initially proposed that this indicator measure the percentage of family planning demand satisfied with a modern method among women aged 15 - 49 years who are married or in a union. In the DHIS, a more sensitive measure of the contraceptive prevalence rate is provided by the couple year protection rate (CYPR). It is important, though, to note that the CYPR cannot distinguish between single method and dual method use. Condoms are therefore assumed to be used alone, and not in combination with another method, leading to a possible over-estimation of the proportion of couples protected.

In 2016/17, Limpopo (LP) had the highest CYPR in South Africa, followed by the Western Cape (WC) and KwaZulu-Natal (KZ), while the Northern Cape (NC), North West (NW) and Gauteng (GP) had the lowest rates. The five best-performing districts were located across the provinces, namely Waterberg (LP), Sedibeng (GP), Fezile Dabi (Free State (FS)), uMzinyathi (KZ) and Central Karoo (WC). Notably, most of the districts in the Western Cape were among the 10 top-performing districts for this indicator, with the sole exceptions of West Coast and Cape Town. The worst-performing district for this indicator was Alfred Nzo in the Eastern Cape (EC).

### UHC2: Pregnancy and delivery care

The initial measure proposed for this indicator was the percentage of births attended by skilled health personnel. However, due to differences in the measurement of this indicator across countries, Hogan et al. used the percentage of women attending four or more ANC visits instead. The proxy measure that can be calculated from DHIS data, which incorporates a measure of quality of care, is the index of pregnant women who attend ANC before 20 weeks' gestation. Other alternative measures available from the DHIS for this indicator are ANC 1st visit coverage, and delivery in facility rate; however these indicators are less sensitive to considerations of quality.

Nationally, only half of pregnant women attended their first ANC visit before 20 weeks' gestation at public health facilities, which potentially indicates that pregnant women are still experiencing barriers in accessing antenatal care.

<sup>i</sup> Modelling done by Daniel Shapiro, Insight Actuaries.

<sup>j</sup> Lozano R, Fullman N, Abate D, et al. Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392(10159):2091-138.

Mpumalanga (MP), Northern Cape and Western Cape had the highest coverage of pregnant women accessing ANC before 20 weeks' gestation, while the Eastern Cape had the poorest coverage.

Overberg (WC), Ehlanzeni (MP) and Xhariep (FS) were the best-performing districts for this indicator. It was also interesting to note that Waterberg (LP) was among the top five best-performing districts, even though it is located in Limpopo where 80% of people live in rural areas and have to travel long distances, at significant expense, to reach treatment and care.<sup>k</sup> Alfred Nzo (EC) was the worst-performing district. Generally, the Eastern Cape districts were the worst-performing districts, which is alarming considering that ANC visits provide an opportunity for pregnant mothers to access care for other conditions that could have an adverse impact on their health and that of their unborn babies. Late attendance for ANC also contributes to increased foetal, maternal and infant morbidity and mortality,<sup>l</sup> which could be a contributing factor in the poor RMNCH outcomes recorded in the Eastern Cape.

### UHC3: Child immunisation

As a measure of child immunisation coverage, Hogan et al. used the percentage of children aged under 1 year who had received three doses of diphtheria, tetanus and pertussis (DTP) vaccine, whether administered as such or as part of a polyvalent vaccine. However, it was decided to calculate the South African index on the basis of the immunisation coverage under 1 year with the full Expanded Programme on Immunisation (EPI) regimen in place at that point in time. This option was relied on in line with the global trend towards tracking multiple antigens.<sup>e,j</sup> This option also eliminated the challenge of tracking DPT3 coverage using routine data, as changes in vaccine composition can lead to different data elements being collected in facilities over time.<sup>m</sup>

The highest immunisation coverage for children under 1 was in the Northern Cape, followed closely by Mpumalanga. The two provinces with the lowest coverage were the Eastern Cape and North West. Coverage for children under 1 was highest in two Northern Cape districts (Zwelentlanga Fatman Mgcawu and John Taolo Gaetsewe), two KwaZulu-Natal districts (eThekweni and uMzinyathi), and one in Mpumalanga (Ehlanzeni). Although immunisation coverage was lowest in most districts in the Eastern Cape (with Sarah Baartman, Nelson Mandela Bay and Amathole the worst-performing districts), coverage was relatively good in OR Tambo and, surprisingly, in Alfred Nzo district. The latter was the worst-performing district in the preceding RMNCH indicators.

### UHC4: Child treatment

It was proposed that the initial measure of child treatment be care-seeking behaviour for children with suspected pneumonia.<sup>e</sup> Pneumonia is a leading cause of child illness and death. However, the chosen measure for inclusion in the South African index was the rescaled pneumonia case fatality rate (CFR) for children under 5 years of age, as this is a routine data alternative that is a proxy for pneumonia treatment access in children. The pneumonia CFR under 5 years is defined as the number of pneumonia deaths in children under 5 years as a proportion of pneumonia separations under 5 years in health facilities. Pneumonia separations refers to the sum of inpatient deaths, inpatient discharges and inpatient transfers among children under 5 years of age diagnosed with pneumonia. Consequently, it is only a measure of deaths in children admitted to a health facility. Any children who succumb to pneumonia outside of health facilities will not be included. Nonetheless, this measure is a proxy for the measure initially proposed, and incorporates a quality element in that it measures the ultimate endpoint of access to treatment.

The rescaled pneumonia case fatality under 5 years rate ranged from a high value of 98.8 in the Western Cape to a low of 89.3 in the Eastern Cape. Despite being rescaled in relation to the maximum recorded value, there was little variability in this indicator between provinces in 2016/17, since CFRs have decreased dramatically across most of the country over the past 15 years or so that this measure has been tracked. The performance of this indicator is quite sensitive to the dataset selection as this determines the maximum risk value used for rescaling. The Western Cape districts (West Coast, Overberg, Cape Winelands, Cape Town and Garden Route) were among the top five best-performing districts for this indicator. Capricorn (LP), OR Tambo (EC) and Fezile Dabi (FS) were among the worst performers.

### UHC service coverage index for the RMNCH category

Figure 1 shows that overall, the five top-performing districts for the RMNCH category were: Overberg (WC), Ehlanzeni (MP), uMzinyathi (KZ), Xhariep (KZ) and Waterberg (LP). The majority of poor-performing districts overall were from the Eastern Cape (Alfred Nzo, Nelson Mandela Bay, Joe Gqabi, Amathole and Buffalo City). Two other metropolitan areas among the worst-performing districts were Tshwane (GP) and Mangaung (FS). Generally, the Eastern Cape has been noted for poor performance in RMNCH, so these results were not surprising. One of the key drivers of poor health outcomes in the RMNCH

k Treatment Action Campaign. State of Provincial Healthcare System: Spotlight on Limpopo. Johannesburg: TAC; 2018.

l Kaswa R, Rupesinghe GFD, Longo-Mbenza B. Exploring the pregnant women's perspective of late booking of antenatal care services at Mbekweni Health Centre in Eastern Cape, South Africa. *Afr J Prim Health Care Fam Med.* 2018;10(1):e1-9.

m Dlamini NR. Immunisation. In: Massyn N, Pillay Y, Padarath A, editors. *District Health Barometer 2017/18.* Durban: Health Systems Trust; 2018.

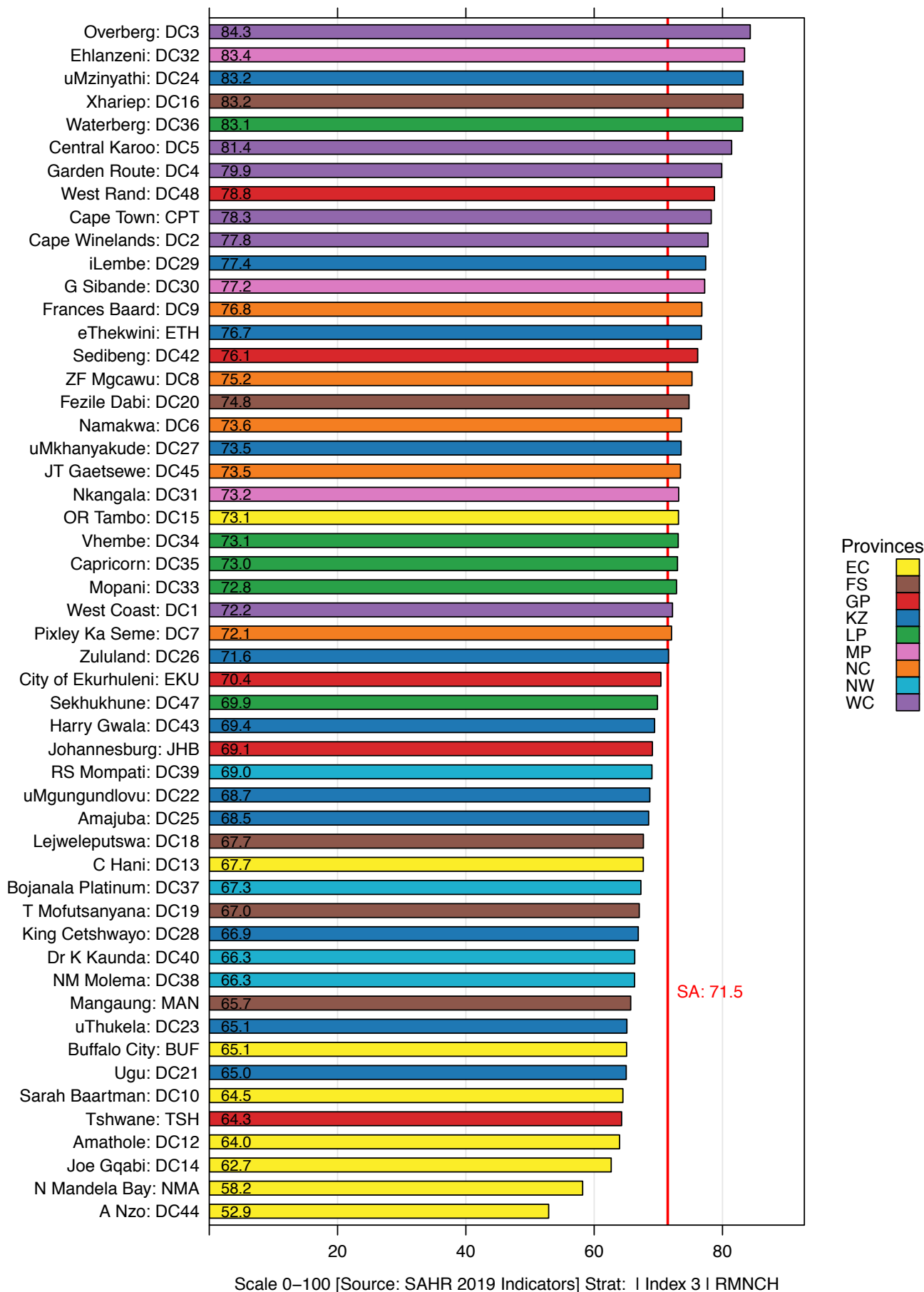
indicators in the Eastern Cape has been poor quality of care, which leads to late presentation of pregnant women at health facilities.<sup>n</sup> In addition to poor quality care, other drivers of maternal deaths in the Eastern Cape have been linked to lack of transport to get to facilities and also the long distances required to reach transport or the facility, which leads to late or delayed presentation at the health facility. The additional costs of transportation to the facility that many women cannot afford have also been noted as a contributing factor, especially in the rural areas where the roads are in poor condition and there are also high levels of poverty and poor infrastructure.<sup>o</sup>

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n Lembani M, de Pinho H, Delobelle P, Zarowsky C, Mathole T, Ager A. Understanding key drivers of performance in the provision of maternal health services in Eastern Cape, South Africa: a systems analysis using group model building. *BMC Health Serv Res.* 2018;18(1):912.

o Available from: <http://muhaz.org/the-26th-conference-on-priorities-in-perinatal-care-in-south-a.html>.

Figure 1: UHC service coverage index by district for the RMNCH category, 2016 - 2017





## Infectious diseases

### UHC5: TB treatment

The 5th UHC indicator measures TB effective treatment coverage by combining the case detection rate and the treatment success rate to estimate the proportion of TB cases that are detected and successfully treated. However, the case detection rate cannot be measured routinely from patient data. There is currently only a single national estimate of the case detection rate (68%), based largely on expert opinion.<sup>p</sup> The treatment success rate captured on the electronic TB register for drug-sensitive TB was used. Drug-resistant TB treatment outcomes should ideally be considered too, but were excluded from the current index, as different treatment periods and regimens make it problematic to combine data from separate treatment cohorts.

There was very little variation between the provinces in terms of TB effective treatment coverage, with the index value for all provinces being in the 50s. The best performance was evident in Gauteng, followed by the Eastern Cape, while the poorest performances were recorded in the Northern Cape and North West.

uMgungundlovu (KZ) was the best-performing district for this indicator, followed by OR Tambo (EC), uMzinyathi (KZ), West Rand (GP) and Chris Hani (EC). The best-performing metro, which was among the 10 top-performing districts, was Johannesburg (GP). However, the two worst-performing districts (uThukela and Amajuba) were also in KwaZulu-Natal, indicating considerable differences in TB treatment outcomes in this province.

### UHC6: HIV treatment

The indicator proposed by Hogan et al. for UHC6 was the percentage of PLHIV who are receiving antiretroviral therapy (ART). For the South African index, a better indicator of effective service coverage is the percentage of PLHIV on ART who are virally suppressed.

Although a positive upward trend has been observed for this indicator in South Africa, indicative of the vast resources and efforts that have been put into the world's largest national ART programme, the number of PLHIV who are on ART and virally suppressed is still below target values. Limpopo was the best-performing province, followed closely by Mpumalanga, while the poorest performances were recorded in Gauteng and North West. The 2017 South African National HIV Prevalence, Incidence, Behaviour and Communication Survey reported that of all PLHIV in the country, 62.3% were on ART, which translates to 4.4 million people. In terms of viral load suppression, the viral load results were available for 2 946 PLHIV in this survey, of whom 62.3% were virally suppressed. In terms of the 90-90-90 targets, in the 15 - 65-year age group almost 85% of PLHIV knew their status (first 90) at the time the survey was conducted, and 70.6% of them were on ART as well (second 90). Of those on ART, 87.5% were virally suppressed (third 90).<sup>q</sup> Interestingly, the values presented in this survey are substantially higher than those reported in TIER.Net and Thembisa. Possible reasons for the differences in values with TIER.Net could include the following:

- ◆ Although the denominator in TIER.Net is the total PLHIV, the numerator only includes public sector viral suppression records.
- ◆ Incomplete reporting, as noted in the study done in Khayelitsha,<sup>r</sup> would affect the numerator as it only reflects patients recorded in the system.
- ◆ Viral suppression at 12 months may be more restrictive than a cross-sectional measure in a survey.

Compared with the 2017 South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, the best-performing districts were Overberg (WC), Mopani (LP), Thabo Mofutsanyana (FS), Ehlanzeni (MP) and Namakwa (NC), while the survey recorded that viral load suppression was above 90% in the following five districts: Cape Town (WC), Sedibeng (GP), uMzinyathi (KZ), King Cetshwayo (KZ) and the West Rand (GP).<sup>t</sup>

The three worst-performing districts were Frances Baard (NC), Central Karoo (WC) and Ngaka Modiri Molema (NW), followed by the worst-performing metro, namely Ekurhuleni (GP). The worst-performing districts in the survey were Ehlanzeni (MP), Gert Sibande (MP) and eThekweni (KZ).

### UHC7: Malaria prevention

This indicator measures the percentage of the population at risk who sleep under insecticide-treated bed-nets. The indicator cannot be measured in South Africa, as bed-nets are not provided routinely. South Africa has a low incidence and

p World Health Organization. Global Tuberculosis Report 2018. Geneva: WHO; 2018.

q Simbayi L, Zuma K, Zungu N, et al. South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2017. Cape Town: HSRC Press; 2019.

r Euvrard J, Schulz T, Hilderbrand K, et al. How accurately do routinely reported HIV viral load suppression proportions reflect progress towards the 90-90-90 target in the population on antiretroviral treatment in Khayelitsha, South Africa? *S Afr Med J.* 2019;109(3):174-7.

prevalence of malaria. Although only three provinces (KwaZulu-Natal, Limpopo and Mpumalanga) have malaria-endemic areas, imported cases are notified from other provinces.<sup>s</sup>

### UHC8: Water and sanitation

The motivation for including this tracer indicator, initially proposed as the percentage of households with access to basic sanitation, is the link between poor water, sanitation and hygiene and increased risk of diarrhoeal diseases.<sup>t</sup> In South Africa, an indicator based on the percentage of households with access to improved sanitation (defined as access to a flush toilet (whether connected to piped sewers, a septic tank or a pit latrine), a ventilated improved pit latrine, a pit latrine with a slab, or a composting toilet) is collected by Stats SA via periodic surveys (Census, intercensal Community Surveys and annual General Household Surveys). The most recent data source for this indicator at district level was available from the intercensal Community Survey conducted in 2016. An upward trend in the number of households using chemical toilets has been observed in South Africa.<sup>u</sup>

The Western Cape had the highest percentage of households with access to improved sanitation, followed by Gauteng. These are also the least-deprived provinces in the country.<sup>v</sup> A higher proportion of toilet facilities are located in formal dwellings than in traditional or informal dwellings,<sup>y</sup> which could be a contributing factor to the lowest access to improved sanitation being observed in the largely rural Limpopo province.

The best-performing districts were predominantly from the Western Cape, with Johannesburg (GP) rounding off the top five. The worst-performing areas were dominated by districts in KwaZulu-Natal (iLembe, uMkhanyakude, Zululand and Harry Gwala). The two worst-performing districts were Sekhukhune (LP) and Ehlanzeni (MP), which have large rural populations. Across Africa, poor access to improved sanitation is a feature of under-developed rural areas.<sup>w</sup>

### UHC service coverage index for the infectious diseases category

Overall, the UHC service coverage index for the infectious diseases category was highest in Overberg (WC), as illustrated in Figure 2, and lowest in Sekhukhune (LP). The majority of districts in KwaZulu-Natal performed poorly in this category, with Zululand, Harry Gwala, iLembe, Amajuba and uThukela among the 10 worst-performing districts in the country.

s Raman J, Morris N, Frean J, et al. Reviewing South Africa's malaria elimination strategy (2012-2018): progress, challenges and priorities. *Malar J*. 2016;15:438. doi: 10.1186/s12936-016-1497-x.

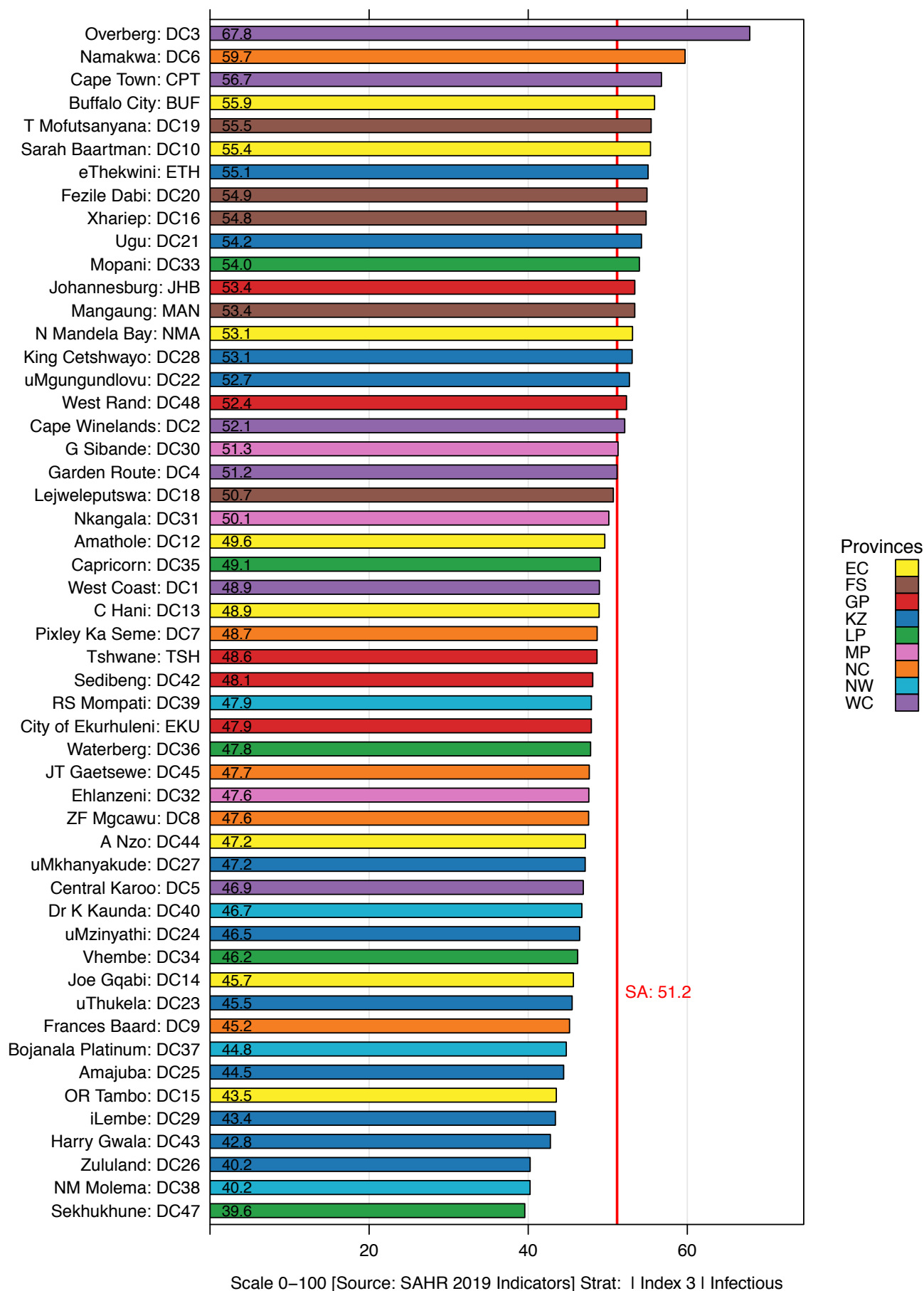
t Winter S, Dzombo MN, Barchi F. Exploring the complex relationship between women's sanitation practices and household diarrhea in the slums of Nairobi: a cross-sectional study. *BMC Infect Dis*. 2019;19(1):242.

u Statistics South Africa. Community Survey 2016. Statistical Release P0301. Pretoria: Stats SA; 2016.

v Noble M, Zembe W, Wright G, Avenell D. Multiple Deprivation and Income Poverty at Small Area Level in South Africa in 2011. Cape Town: Southern African Social Policy Research Institute and Southern African Social Policy Research Insights (SASPRI); 2013.

w Angoua E, Dongo K, Templeton MR, Zinsstag J, Bonfoh B. Barriers to access improved water and sanitation in poor peri-urban settlements of Abidjan, Côte d'Ivoire. *PLoS One*. 2018;13(8):e0202928. doi:10.1371/journal.pone.0202928.

Figure 2: UHC service coverage index by district for the infectious diseases category, 2016 - 2017



**Non-communicable diseases****UHC9: Prevention of cardiovascular disease**

One of the leading risk factors for cardiovascular disease is uncontrolled hypertension.<sup>a</sup> The proposed proxy measure of service coverage was therefore the prevalence of non-raised blood pressure, regardless of treatment status, expressed as a percentage. In South Africa, there has been an increase in the prevalence of hypertension, and in addition, too few hypertensive cases are controlled on treatment.<sup>x</sup> The tracer indicator for the South African index was calculated from the only South African source that provides blood pressure measurements at district level, namely the 'waves' of NiDS, age-standardised and then rescaled in relation to the lowest recorded value.

The index value for non-raised blood pressure was highest in Mpumalanga (70) and lowest in the Northern Cape (50). The Western Cape and Free State were among the worst-performing provinces for this indicator. Analysis of the five waves of the NiDS showed that there was an increase in the prevalence of non-raised blood pressure across districts, with the variability between districts enhanced by the rescaled index. The index for non-raised blood pressure was highest in Sedibeng (GP), followed by Ehlanzeni (MP) and Capricorn (LP). The districts in three provinces (Northern Cape, Western Cape and Free State) ranked the worst for this indicator and included Zwelentlanga Fatman Mgcawu (NC), Cape Winelands (WC), Overberg (WC), Namakwa (NC), West Coast (WC), Xhariep (FS) and Mangaung (FS). The only district among the worst-performing districts that was from a different province was Joe Gqabi (EC). The best-performing metro was Tshwane (GP).

**UHC10: Management of diabetes**

Similarly to hypertension, there has been a dramatic increase in the prevalence of diabetes in sub-Saharan Africa, with an alarmingly high percentage of people with undiagnosed diabetes.<sup>y</sup> A very high percentage of diabetics with unmet need for care has also been demonstrated in the South African population.<sup>z</sup> The proposed tracer indicator for the management of diabetes is calculated from the age-standardised mean fasting plasma glucose value in those aged 25 years and older, which is a proxy for both diabetes prevalence and control. However, the South African index was based on modelled diabetes treatment coverage, based on predicted probabilities of prevalence per district, and the ratio between the population proportion of treated cases and diabetes prevalence.

The index value for diabetes treatment coverage was generally quite low for most provinces, with the highest coverage recorded in the Northern Cape and the lowest coverage observed in the Free State. Diabetes treatment coverage was highest in Sedibeng (GP) and two of the three districts (Nkangala and Ehlanzeni) in Mpumalanga. The best-performing metro was Ekurhuleni (GP), while both Buffalo City and Nelson Mandela Bay in the Eastern Cape were among the worst-performing. West Rand (GP) had the lowest diabetes treatment coverage index, with a number of districts in KwaZulu-Natal (uMzinyathi, iLembe, King Cetshwayo, uMgungundlovu, uMkhanyakude, and Ugu) among the worst performers overall.

**UHC11: Cancer detection**

Cervical cancer screening coverage is the only indicator included in the core indicator data set of the NCD Global Monitoring Framework.<sup>9</sup> The data used for calculation of this tracer indicator are routinely captured in DHIS as the proportion of women who have had a cervical screening test (regardless of the method used), defined as the number of cervical screening tests performed as a proportion of one-tenth of the female population aged 30 years and older. After the introduction of the Cervical Cancer Prevention and Control Policy<sup>aa</sup> in 2017, which states that women should have three cervical smears done at 10-yearly intervals in a lifetime, starting at the age of 30 years, and three-yearly intervals if they are diagnosed with HIV, the data element definition was amended to accommodate this implementation. Consequently the definition now includes the following smears as part of cervical cancer screening coverage, which could result in the current measure being an inaccurate representation of coverage:

- ◆ Smears done on HIV-positive women.
- ◆ Smears done during antenatal care.
- ◆ Smears done during postnatal care.
- ◆ Diagnostic smears.

KwaZulu-Natal's cervical cancer screening coverage was significantly higher than that of the other provinces, with a coverage index of over 90, which is likely to be the result of the high incidence of women with HIV as HIV-positive women are screened more regularly as per the Cervical Cancer Prevention and Control Policy.<sup>aa</sup> The second and third best-performing

x Day C, Groenewald P, Laubscher R, Chaudhry S, Van Schaik N, Bradshaw D. Monitoring of non-communicable diseases such as hypertension in South Africa: challenges for the post-2015 global development agenda. *S Afr Med J*. 2014;104(10):680-7.

y Hird TR, Pirie FJ, Esterhuizen TM, et al. Burden of diabetes and first evidence for the utility of HbA1c for diagnosis and detection of diabetes in urban Black South Africans: The Durban Diabetes Study. *PLoS One*. 2016;11(8):e0161966.

z Stokes A, Berry KM, Mchiza Z, et al. Prevalence and unmet need for diabetes care across the care continuum in a national sample of South African adults: Evidence from the SANHANES-1, 2011-2012. *PLoS One*. 2017;12(10):e0184264.

aa Massyn N, Pillay Y, Padarath A, editors. *District Health Barometer 2017/18*. Durban: Health Systems Trust; 2018.

provinces had a coverage index in the 70s. Among the poor-performing provinces were the Northern Cape, Gauteng and Free State. Eight of the 11 districts in KwaZulu-Natal were among the 10 top-performing districts for this indicator, with the exception of Zululand, uMgungundlovu and eThekweni. The other two districts in the top 10 were Ehlanzeni (MP) and Xhariep (FS). The majority of districts (four of five) in the Northern Cape were among the worst performers in the country, with Frances Baard performing the worst in the country.

#### UHC12: Tobacco control

The prevention of lung cancer through tobacco control is the final indicator in the NCD category and it is a proxy of the adoption and enforcement of anti-tobacco policies.<sup>9</sup> The proposed indicator is the age-standardised prevalence of adults (15 years and older) who report not having smoked tobacco in the 30 days preceding a survey. Data for this indicator are not available from routine sources. Consequently, the index was calculated from the five waves of NiDS.

The highest percentage of adults who had not smoked in the previous 30 days was recorded in Limpopo (87.9%), followed closely by KwaZulu-Natal (87.2%) and the Eastern Cape (83.4%). These data partially support the finding that the most frequent tobacco users in South Africa are those who live in predominantly urban areas.<sup>bb</sup> The prevalence of non-smoking was lowest among adults in the Northern Cape, Western Cape and Gauteng.

Among the best-performing districts were uMkhanyakude, Zululand, King Cetshwayo and uMzinyathi (all KZ) and Sekhukhune (LP). A large number of districts from the Western Cape were among the worst-performing districts, including Central Karoo, West Coast, Overberg, Garden Route and Cape Winelands. Namakwa (NC) was the worst-performing district for this indicator. Zwelentlanga Fatman Mgcawu (NC), Pixley Ka Seme (NC), and Sarah Baartman (EC) were also among the worst-performing districts.

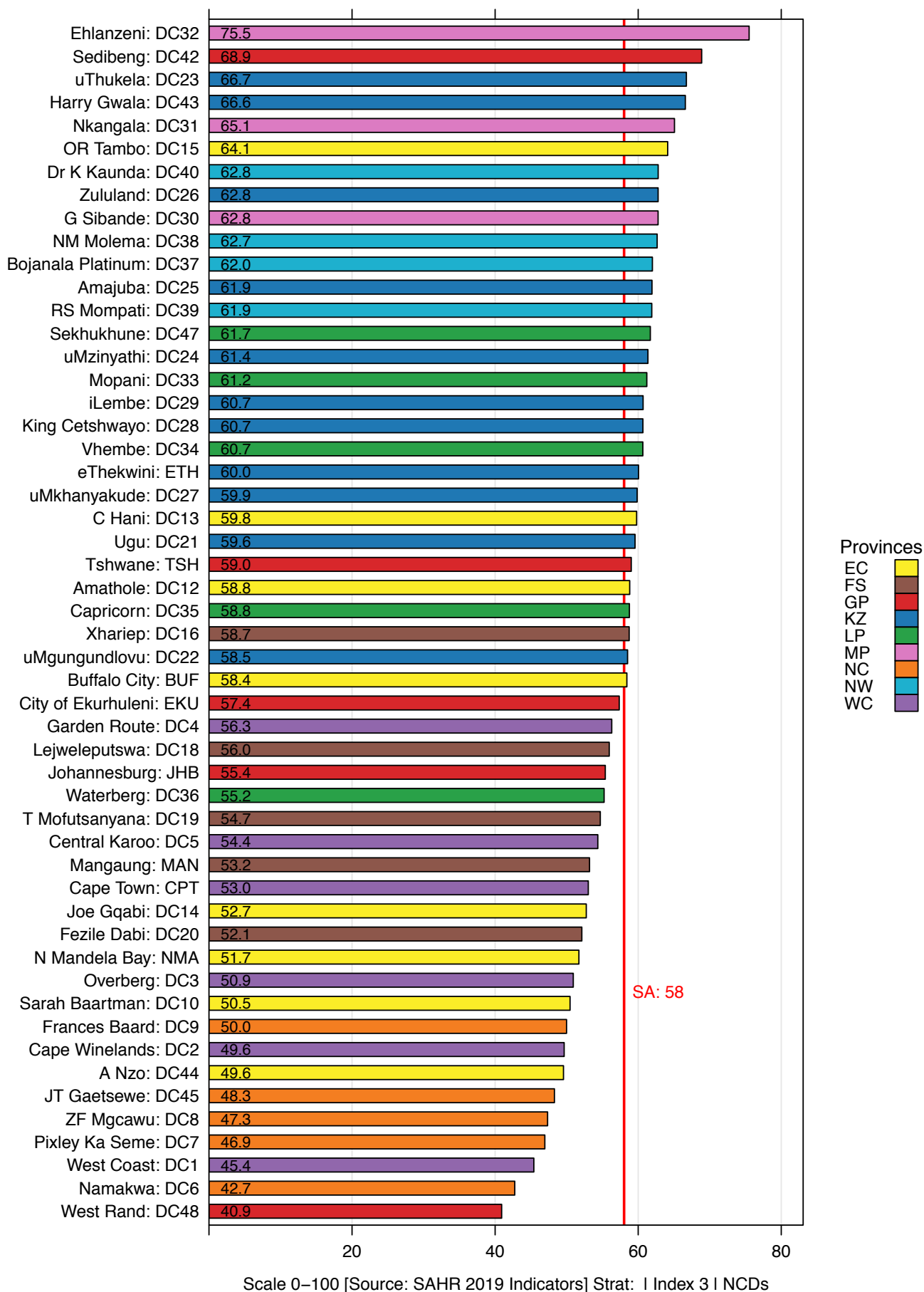
#### UHC service coverage index for the NCD category

The burden of NCDs has been increasing rapidly, not only globally but specifically in sub-Saharan African countries. South Africa was found to be one of four countries in sub-Saharan Africa with higher age-standardised mortality rates due to NCDs than wealthier countries with a higher income.<sup>cc</sup> Overall, the districts in the Northern Cape were among the worst performers in the NCD category in South Africa (Figure 3). Ehlanzeni (MP), Sedibeng (GP), uThukela (KZ), Harry Gwala (KZ) and Nkangala (MP) were among the five best-performing districts overall in the NCD category. Mpumalanga appears to be doing relatively well at managing NCDs, as all three of its districts were among the top 10 performers. OR Tambo (EC) was the best-performing district, while eThekweni (KZ) was the best-performing metro overall.

bb Teare JA, Naicker N, Albers P, Mathee A. Prevalence of tobacco use in selected Johannesburg suburbs. *S Afr Med J*. 2017;108(1):40-44. Available from: [http://www.scielo.org.za/scielo.php?script=sci\\_arttext&pid=S0256-95742018000100013&lng=en](http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-95742018000100013&lng=en). <http://dx.doi.org/10.7196/samj.2018.v108i1.12283>.

cc Essel V, van Vuuren U, De Sa A, et al. Auditing chronic disease care: Does it make a difference? *Afr J Prim Health Care Fam Med*. 2015;7(1).

Figure 3: UHC service coverage index by district for the NCD category, 2016 - 2017



## Service capacity and access

### UHC13: Facility access

The first indicator in the service capacity and access category is a proxy measure, namely the number of hospital beds per 10 000 population. The index is calculated relative to a threshold value of 18 hospital beds per 10 000 population. This measure is likely to be skewed in some districts due to the presence of regional and central hospitals. Although located in a particular district, such hospitals serve patients from many districts or even from different provinces. Additionally, the inclusion of private-sector beds would skew the index, as private hospitals are typically located only in major urban areas. Consequently, for South Africa, a more sensitive measure might be the number of public sector district hospital beds per 10 000 uninsured population. Nonetheless, for the South African index, the total number of public sector hospital beds was used, normalised by a modelled estimate of the uninsured population per district, generated using a small area model based on the 2011 Census and 2016 Community Survey, and scaled using the 2018 General Household Survey and the Council for Medical Schemes data. The threshold of 18 hospital beds per 10 000 population was applied, as proposed by Hogan et al. The ideal clinic facility measures could also be a potentially more discriminating routine data alternative for this tracer indicator in future as they are based on quality-improvement processes, especially once ideal measures are available for hospitals as well as PHC facilities.

The calculated hospital bed density index was 100 (i.e. met or exceeded the threshold of 18 hospital beds per 10 000 population) for six of the nine provinces, and was also 100 for 22 of the 52 districts in South Africa. Furthermore, the hospital bed density was over 90 for 27 districts, which is approximately half of all districts in the country. The three provinces with the lowest hospital bed density indices were Mpumalanga, North West and Limpopo. The worst-performing districts were Bojanala (NW), Xhariep (FS), Nkangala (MP), Overberg (WC), and John Taolo Gaetsewe (NC). All the metropolitan areas apart from Ekurhuleni (GP) had hospital bed density indices of 100.

### UHC14: Health worker density

The defined indicator for the second service capacity and access category is the number of health professionals per person, combining the numbers of physicians, psychiatrists and surgeons. It is not possible to calculate this index, as access to the numbers of specific medical specialists is difficult. As a result, it was decided to follow the advice of the GBD 2017 SDG Collaborators, and calculate the index on the basis of the thresholds of 30 physicians, 100 nurses and midwives, and five pharmacists per 10 000 population. Public sector (PERSAL) data were therefore combined with modelled estimates of uninsured population per district, since information on professionals in private practice is not available at district level. Like many countries, South Africa has a reported shortage of skilled health workers. There are also marked differences in the distribution of health workers between the public and private sector, and between rural and urban populations.<sup>dd,ee</sup>

Health worker density index values were highest in the Northern Cape, Western Cape and Gauteng, and lowest in the North West, Mpumalanga and Free State. The two best-performing districts (Frances Baard (NC) and Buffalo City (EC)) and the two worst performers (Alfred Nzo (EC) and John Taolo Gaetsewe (NC)) were all from the Northern Cape and Eastern Cape.

### UHC15: Access to essential medicines

The proposed indicator is described as the proportion of health facilities with availability of the WHO-recommended core list of essential medicines. Globally, there are still insufficient data to measure this indicator, with less than 30 countries having the required primary data.<sup>a</sup> The alternative measure for the South African index, which is routinely captured in the DHIS, is defined as the proportion of primary care facilities (fixed clinics, CHC/CDCs) that experienced a stock-out of any tracer item for any time during the period under review. The index is expressed as the rescaled inverse of the stock-out proportion.

Among the provinces, the best-performing province was North West, followed by the Western Cape and KwaZulu-Natal. Among the worst-performing provinces were Limpopo and Free State. The top five best-performing districts were Overberg (WC), Namakwa (NC), Zwelentlanga Fatman Mgcawu (NC), Central Karoo (WC), and Cape Winelands (WC). The best-performing metro was Buffalo City (EC), while the worst-performing metro was Mangaung (FS). The worst-performing districts were from either Limpopo or the Free State. These were Vhembe (LP), Fezile Dabi (FS), Mopani (LP), Lejweleputswa (FS) and Sekhukhune (LP). Vhembe district recorded a very low index value of only 28.7, which was almost half of the next lowest value (54.8) in Fezile Dabi.

dd Anyangwe SC, Mtonga C. Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa. *Int J Environ Res Public Health*. 2007;4(2):93-100. doi:10.3390/ijerph2007040002

ee Essack S. Models for increasing the health workforce. *S Afr Med J*. 2012;102(11): 830-2. doi:10.7196/SAMJ.5779.

**UHC16: Health security**

The last UHC service coverage index covers health security, and it is proposed that it be based on the IHR core capacity index. The data for this indicator include 13 core capacities, covering national legislation, policy and financing; co-ordination and National Focal Point communications; surveillance; response; preparedness; risk communication; human resources; laboratory; points of entry; zoonotic events; food safety; chemical events; and radio-nuclear emergencies. However, the data for this indicator are only available at national level. In order to calculate a district-level index, the South African index relied on the environmental health services compliance rate. The environmental health services rate is measured according to a set of minimum service delivery standards that must be met by a municipality in order for it to be deemed to be compliant with the set national norms and standards. The NDoH used an assessment tool divided into five domains related to clients' rights, operational management, facility and infrastructure, leadership and co-operative governance, and operations.<sup>ff</sup>

The province with the highest environmental health services compliance rate was the Free State, followed by Gauteng and North West. The worst-performing provinces were Limpopo, the Northern Cape and KwaZulu-Natal. There was quite a high range in the environmental health services compliance rate among the districts, with the best-performing district, Harry Gwala, with a rate of 91, and the worst-performing district, uMkhanyakude, with a rate of only 22 (both KZ). In addition to Harry Gwala, Sedibeng (GP), Pixley Ka Seme (NC), Thabo Mofutsanyana (FS), Dr K Kaunda (NW), Xhariep (FS), Sekhukhune (LP), eThekweni (KZ), West Coast (WC), and Ngaka Modiri Molema (NW) were the best-performing districts. The other poor-performing districts were Frances Baard (NC), Waterberg (LP), Dr Ruth Segomotsi Mompati (NW), Amajuba (KZ), Mopani (LP) and Zwelentlanga Fatman Mgcawu (NC). Nelson Mandela Bay (EC) was the worst-performing metro.

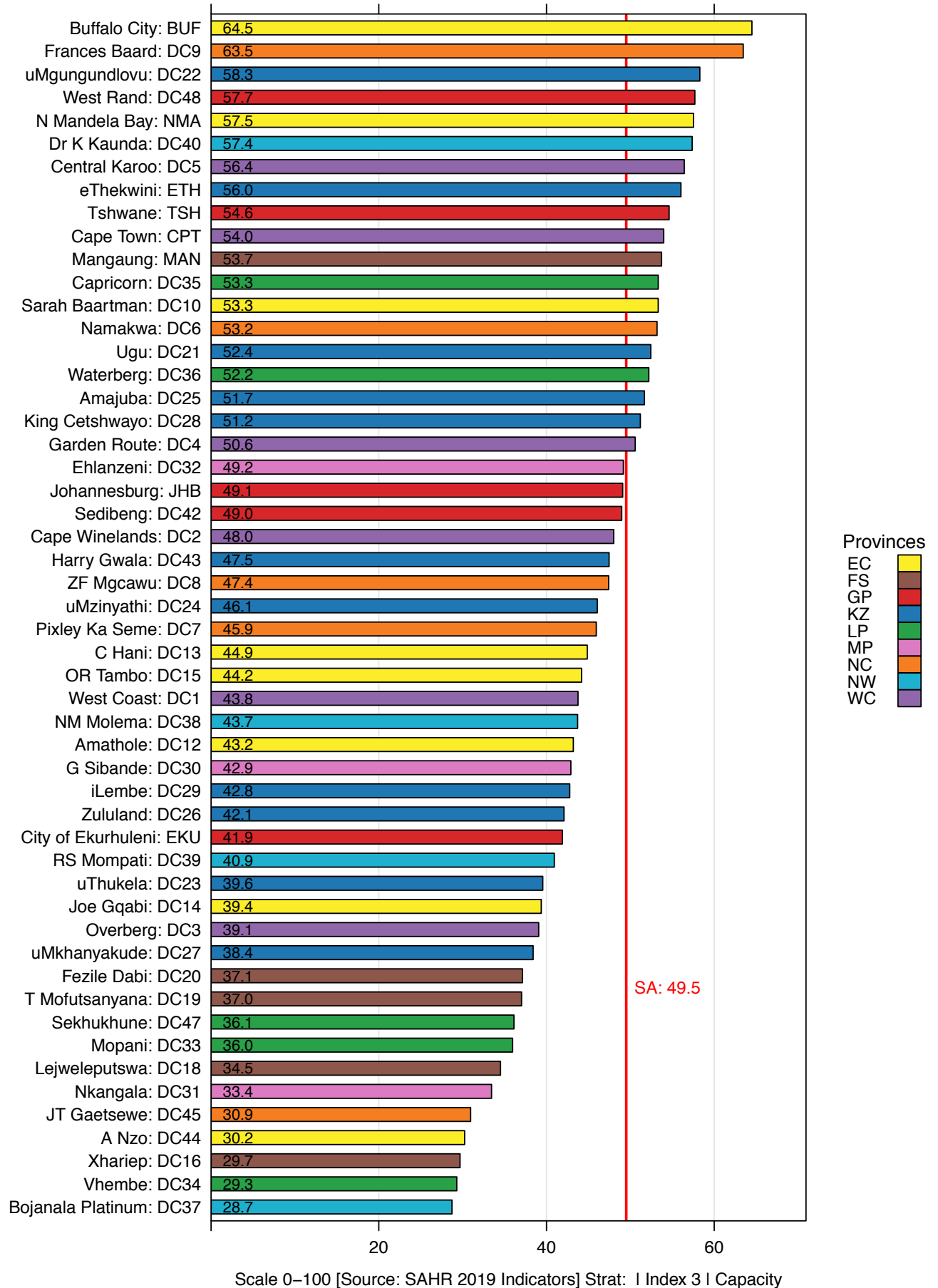
**UHC service coverage index for the service capacity and access category**

Buffalo City (EC) was the best-performing district overall with regard to the service capacity and access category (Figure 4). Other high-performing districts in this category were Frances Baard (NC), uMgungundlovu (KZ), West Rand (GP), and Nelson Mandela Bay (EC). Bojanala Platinum (NW) was the worst performer, trailed closely by Vhembe (LP), Xhariep (FS), Alfred Nzo (EC) and John Taolo Gaetsewe (NC). The Free State districts were generally among the poorest performers, with the exception of Mangaung.

<sup>ff</sup> Massyn N, Peer N, Padarath A, Day C, editors. District Health Barometer 2016/17. Durban: Health Systems Trust; 2017.



Figure 4: UHC service coverage index by district for the service capacity and access category, 2016 - 2017



### Overall UHC service coverage index

Calculated on the basis of the four category indices as proposed by Hogan et al., the overall UHC service coverage index per country ranged from 22 to 86, with a global median of 65. Hogan et al. reported a value of 67 for South Africa.<sup>g</sup> The adapted South African UHC service coverage index calculated here returned a lower value of 56.9, mostly due to the inclusion of more effective coverage indicators.

The Western Cape and KwaZulu-Natal had the best UHC index value of 58.8 among the provinces, while Limpopo and North West had the worst values, at 53.7 and 53.8 respectively. Among the districts, the best UHC index value of 62.0 was observed in Ehlanzeni (MP) (Figure 5), while the worst index value of 44.0 was measured in Alfred Nzo (EC). The top five best performers were dominated by three metropolitan areas, namely eThekweni (KZ), Buffalo City (EC), and Cape Town (WC), with Sedibeng (GP) completing the top-five list. Among the worst performers were John Taolo Gaetsewe (NC), Bojanala Platinum (NW), Joe Gqabi (EC), Vhembe (LP), and Sekhukhune (LP).

Overall, the following tracer indicators had higher index values, as shown in Table 4, for the UHC service coverage index at both provincial and district level:

- ◆ Couple year protection rate.
- ◆ Immunisation under 1 year coverage.
- ◆ Pneumonia case fatality under 5 years rate (rescaled).
- ◆ Tobacco non-smoking prevalence.
- ◆ Hospital bed density.
- ◆ Proportion of health facilities with essential medicines.

The RMNCH category had higher index values (Table 5), indicating higher service coverage for the interventions in this category, while the service access and capacity category had lower scores overall. This was particularly driven by the very poor health worker density index. The issue of health worker shortages in South Africa is well known, and human resources for health play a critical role in the effective delivery of health services.

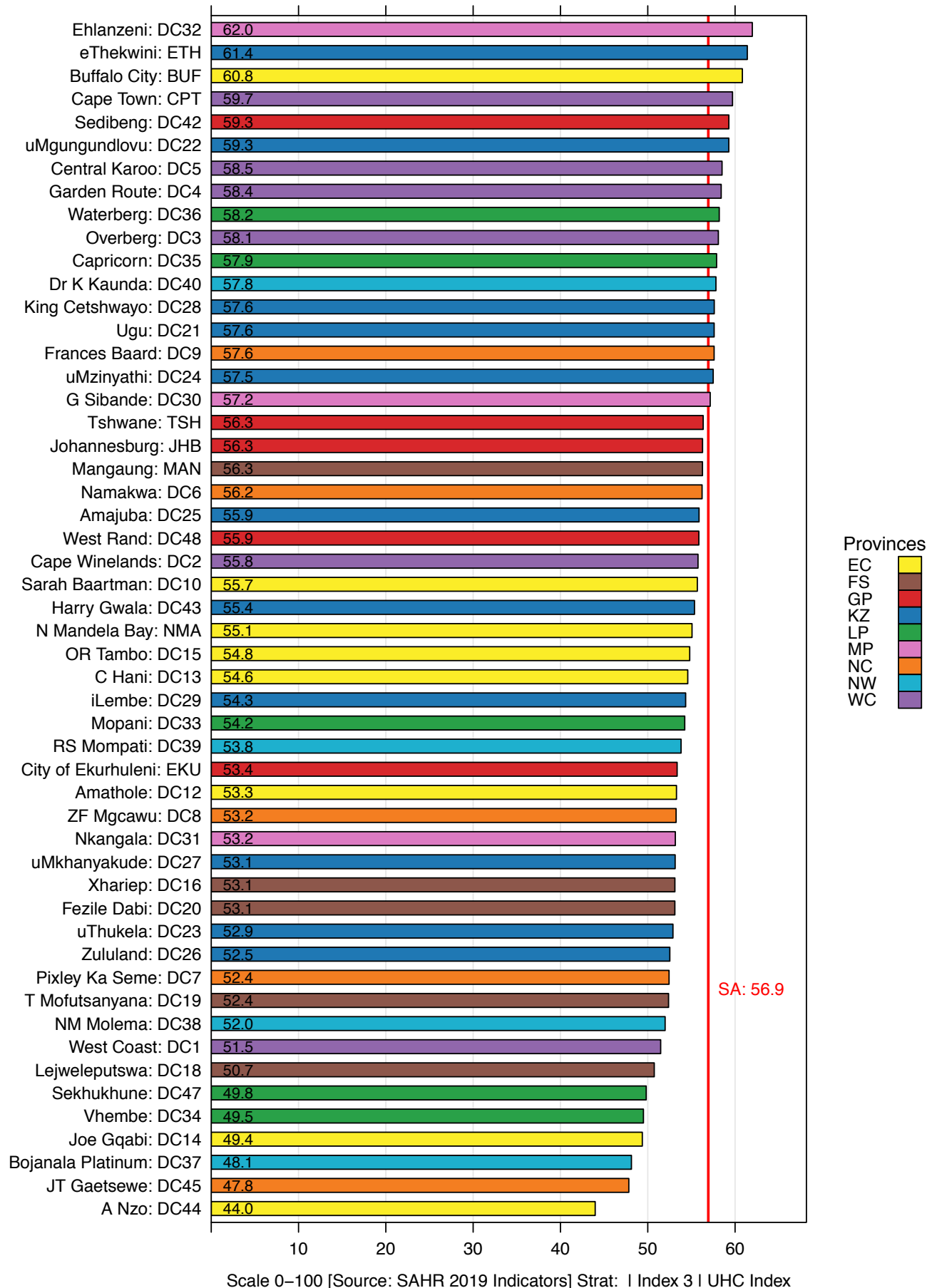
Another indicator that demands increased attention is effective antiretroviral coverage (Table 5). Although South Africa has committed considerable resources to the treatment of HIV, many patients are still not virally suppressed.

Diabetes treatment coverage had the lowest index values in the NCD category (Table 5), which is particularly troubling given the disease burden attributable to this condition.<sup>gg</sup> Effective management of diabetes requires sustained clinical care, which has proved difficult in countries with limited capacity that is largely oriented to managing episodic communicable diseases.<sup>hh</sup>

gg Manne-Goehler J, Atun R, Stokes A, et al. Diabetes diagnosis and care in sub-Saharan Africa: pooled analysis of individual data from 12 countries. *Lancet Diabetes Endocrinol.* 2016;4(11):903-12.

hh Erzse A, Stacey N, Chola L, Tugendhaft A, Freeman M, Hoffman K. The direct medical cost of type 2 diabetes mellitus in South Africa: a cost of illness study. *Glob Health Action.* 2019;12(1):1636611.

Figure 5: UHC service coverage index at district level



**Section A: Universal health coverage index at district level**

**Table 4: UHC service coverage indicators for each tracer indicator**

Geo Level	Prov	Area	2016 & 2017															
			RMNCH				Infectious			NCDs				Capacity				
			1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	
Nat.	ZA	: South Africa	70	51	77	94	56	32	76	60	37	64	81	100	15	82	63	
Province	EC	EC : Eastern Cape	74	38	68	89	57	30	74	61	36	64	83	100	15	83	62	
	FS	FS : Free State	67	49	71	93	55	37	79	54	33	55	80	100	13	65	76	
	GP	GP : Gauteng	60	53	77	93	57	25	89	63	38	52	79	100	15	87	71	
	KZ	KZ : KwaZulu-Natal	74	51	81	93	56	36	65	57	35	91	87	100	15	88	59	
	LP	LP : Limpopo	85	54	70	91	55	39	52	67	33	57	88	81	15	58	55	
	MP	MP : Mpumalanga	71	66	90	91	56	38	60	70	40	78	82	73	12	85	64	
	NC	NC : Northern Cape	60	63	91	94	52	27	79	50	47	43	67	100	19	88	57	
	NW	NW : North West	60	52	69	91	54	26	65	61	45	70	80	80	12	98	66	
WC	WC : Western Cape	81	55	81	99	55	34	94	53	34	58	69	100	16	96	63		
District	EC	BUF : Buffalo City MM	72	41	64	96	58	35	86	56	29	92	78	100	27	100	66	
		DC10 : Sarah Baartman ..	71	43	57	98	52	39	84	51	35	58	63	100	16	95	70	
		DC12 : Amathole DM	92	33	60	93	58	35	60	62	30	76	86	100	9	95	54	
		DC13 : C Hani DM	89	36	70	92	60	32	62	60	34	75	83	100	12	77	59	
		DC14 : Joe Gqabi DM	71	37	64	92	54	28	64	45	37	56	83	86	11	65	60	
		DC15 : OR Tambo DM	82	49	85	83	61	22	61	69	41	67	89	98	13	68	60	
		DC44 : A Nzo DM	43	29	74	86	53	27	72	69	26	38	88	65	5	85	71	
		NMA : N Mandela Bay MM	68	32	58	90	54	30	93	51	30	57	80	100	21	90	57	
	FS	DC16 : Xhariep DM	83	68	87	98	54	35	89	46	34	97	79	30	12	72	84	
		DC18 : Lejweleputswa DM	71	49	65	92	54	28	85	56	36	60	80	80	9	60	73	
		DC19 : T Mofutsanyana ..	62	48	72	94	55	45	68	62	33	55	82	69	9	78	86	
		DC20 : Fezile Dabi DM	100	48	77	83	54	36	84	49	36	53	80	86	11	55	68	
		MAN : Mangaung MM	60	46	70	95	55	35	79	46	44	50	79	100	22	70	70	
		DC42 : Sedibeng DM	100	49	76	89	55	22	92	86	73	49	74	86	15	93	88	
		DC48 : West Rand DM	90	56	82	93	60	27	88	59	10	64	73	100	20	96	61	
	GP	EKU : City of Ekurhuleni ..	57	56	81	95	58	22	87	55	49	51	80	75	12	81	73	
		JHB : Johannesburg MM	59	53	80	92	59	27	94	58	43	49	77	100	14	87	72	
		TSH : Tshwane MM	55	49	67	94	54	26	81	64	40	56	85	100	19	84	63	
		KZ	DC21 : Ugu DM	66	43	66	95	59	45	60	54	30	95	81	100	16	89	75
			DC22 : uMgungundlovu ..	86	44	63	94	61	36	66	62	29	79	83	100	22	90	67
			DC23 : uThukela DM	78	37	67	93	48	33	59	63	37	100	86	72	9	91	62
			DC24 : uMzinyathi DM	100	56	90	94	61	26	65	58	27	100	92	100	11	90	51
			DC25 : Amajuba DM	70	41	79	96	50	24	72	57	32	98	83	100	15	90	45
			DC26 : Zululand DM	70	52	83	88	57	24	49	59	32	87	95	99	9	87	52
			DC27 : uMkhanyakude DM	62	59	86	93	59	38	47	49	30	92	97	100	9	64	22
	DC28 : King Cetshwayo D..		60	47	80	88	58	45	57	54	28	95	94	100	14	96	52	
	DC29 : iLembe DM	79	55	86	95	53	34	45	58	27	100	86	81	12	82	60		
	DC43 : Harry Gwala DM	90	43	64	95	57	28	49	65	35	100	88	100	11	99	91		
	ETH : eThekweni MM	64	60	97	92	56	39	77	55	37	74	87	100	19	94	78		
	LP	DC33 : Mopani DM	88	53	66	90	56	47	60	65	39	62	89	79	10	58	45	
		DC34 : Vhembe DM	81	52	71	94	58	33	51	69	40	57	87	75	12	29	53	
		DC35 : Capricorn DM	88	55	73	80	56	40	53	72	38	50	86	98	19	80	63	
		DC36 : Waterberg DM	100	64	79	94	54	32	64	59	32	57	86	100	19	75	33	
		DC47 : Sekhukhune DM	74	52	67	91	54	38	31	67	37	64	92	65	12	61	80	
	MP	DC30 : G Sibande DM	67	64	88	95	54	31	81	70	40	73	78	81	12	84	59	
DC31 : Nkangala DM		60	62	84	91	58	33	65	66	52	68	77	49	9	81	74		
DC32 : Ehlanzeni DM		83	70	95	88	56	45	43	74	50	97	90	86	16	88	60		
NC	DC6 : Namakwa DM	59	61	86	96	53	45	88	43	42	41	44	98	15	100	57		
	DC7 : Pixley Ka Seme DM	62	61	74	97	53	26	84	46	33	46	71	84	12	100	87		
	DC8 : ZF Mgcawu DM	53	63	100	95	54	26	78	40	39	53	61	90	12	100	49		
	DC9 : Frances Baard DM	66	63	89	94	52	20	86	66	35	37	74	100	30	85	29		
	DC45 : JT Gaetsewe DM	56	59	97	90	54	35	58	47	36	42	76	62	8	63	61		
NW	DC37 : Bojanala Platinu..	58	54	74	89	54	30	56	65	45	63	81	30	8	98	60		
	DC38 : NM Molema DM	59	53	69	90	57	22	53	56	42	76	86	77	11	97	75		
	DC39 : RS Mompoti DM	65	56	70	89	56	25	79	56	48	77	71	66	10	99	43		
	DC40 : Dr K Kaunda DM	67	46	65	96	51	22	91	66	36	83	79	100	19	98	85		
WC	CPT : Cape Town MM	80	55	87	99	54	36	93	58	35	55	71	100	17	92	60		
	DC1 : West Coast DM	83	48	69	99	57	22	93	45	34	48	57	89	10	98	76		
	DC2 : Cape Winelands DM	93	54	74	99	54	28	96	41	39	56	69	88	13	100	57		
	DC3 : Overberg DM	96	71	75	99	59	55	96	43	37	63	66	51	12	100	56		
	DC4 : Garden Route DM	91	60	77	98	54	26	95	50	37	79	69	82	16	99	57		
DC5 : Central Karoo DM	100	59	79	95	52	20	97	47	42	85	53	100	18	100	73			

Max. Data Value  
5 100

Table 5: UHC service coverage by province and district, 2016 - 2017



### Recommendations

The amended South African UHC service coverage index described here should be tracked over time in order to measure progress in relation to the key health-related SDGs. Critically, the index needs to be disaggregated for factors such as sex, gender, age group and urban/rural, to uncover the disparities that exist at lower geographic levels. Inequities can be easily recognised in the South African health system if equity is incorporated in the analysis of coverage at the level of health facilities or per catchment area. Data at district level need to be collected routinely, but greater attention needs to be paid to indicators that are reflective of effective service coverage. In time, the amended South African UHC service coverage index could be improved with the inclusion of more effective service coverage indicators that include a quality component. For example, the RMNCH category had the highest index values, yet maternal and child mortality rates are still higher than they should be, reflecting a lack of quality in the interventions delivered. In addition, the inclusion of indicators on mental health and injuries could add value to the index, since these contribute significantly to the disease burden in South Africa, yet they have been poorly represented in the national indicator data set and have therefore remained relatively 'hidden'.

Considering that the effective implementation of UHC relies not only on the presence of adequate infrastructure but also on access to a skilled health workforce capable of providing the necessary screening, accurate and timely diagnostics and continued clinical care, it is imperative that South Africa focus on these elements and the means for their accurate measurement as the country begins to move towards National Health Insurance (NHI).